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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/478,812	01/07/2000	Yukiyasu Sugano	SON-1718	2204

7590 08/22/2005

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EXAMINER	
LEE, EUGENE	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/478,812	SUGANO ET AL.	
	Examiner	Art Unit	
	Eugene Lee	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,12,17,18,27,28,39,40,53,54,63,65,73 and 74* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,12,17,18,27,28,39,40,53,54,63,65,73 and 74* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 11, 27, 39, 53, 63, and 73 are rejected under 35 U.S.C. 102(b) as being rejected by Noguchi et al. 5,529,951. Noguchi discloses (see, for example, FIG. 23A-23E) a MOS transistor (thin film semiconductor device) 260 comprising a polycrystalline silicon thin film (semiconductor thin film) 241a, gate insulating film 243, and gate electrode 246. In column 22, lines 46-47, Noguchi discloses the silicon thin film having a thickness of 40 nm (30-80 nm). In column 22, lines 48-54, Noguchi discloses the excimer laser light being irradiated on the amorphous silicon layer which recrystallizes the layer to a polycrystalline thin film. This excimer laser light is a single shot radiation that avoids the poor uniformity that is found in the polycrystalline films that have irradiation in several pulses (see, for example, column 2, lines 51-64 of Noguchi). In FIG. 21, Noguchi discloses an excimer laser light (single shot irradiation) 215 that forms a borderless (uniform) silicon thin film.

Regarding the limitation "wherein the semiconductor thin film ... of amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, and irradiated said substrate with an energy beam to convert said semiconductor thin film to polycrystalline silicon having a larger particle diameter than said first particle diameter", this limitation is a product-by-process limitation of converting the semiconductor thin film into polycrystalline silicon.

The limitation "said semiconductor thin film is accumulated by alternately repeating said film forming step and said irradiation step without exposing said substrate to the air" is a product-by-process limitation of producing a thin film with more thickness.

Regarding claim 39, the limitations "emission time width from upstand to downfall of 50 ns or more" and "a desired change to said energy intensity of said laser light from upstand to downfall of said pulse", are product-by-process limitation of converting the semiconductor thin film into polycrystalline silicon.

Regarding claim 73, the limitation "substrate is cooled to a temperature lower than room temperature" is a product-by-process limitation of converting the semiconductor thin film into polycrystalline silicon.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12, 28, 40, 54, 65, and 74 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. '951 as applied to claims 11, 27, 39, 53, 63, and 73 above, and further in view of Tanaka et al. 5,798,744. Noguchi does not disclose a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode.

However, Tanaka discloses (see, for example, FIG. 3) a liquid crystal display apparatus comprising pair of substrates 12/10, liquid crystal (electrooptical substance) 200, counter electrodes 170r, and pixel electrode 150. These components are used to form liquid pixels in a LCD display apparatus. Therefore, it would have been obvious to one of ordinary skill in the art at time of invention to have a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode in order to form the thin film semiconductor device in a LCD display apparatus.

Regarding claim 28, the limitations "said semiconductor thin film is formed by forming a layer of about 20 nm amorphous silicon or polycrystalline silicon" and "is accumulated by alternately repeating said film forming step, where each additional formed film is about 1 nm" produce a semiconductor thin film of greater thickness. Increasing the thickness of a thin film increases its current carrying capacity. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form a layer of about 20 nm amorphous silicon or polycrystalline silicon and accumulate the semiconductor thin films in order to produce a thin film with greater current carrying capacity.

5. Claim 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. 5,529,951 in view of Yamazaki et al. 6,037,197. Noguchi discloses (see, for example, FIG. 23A-23E) a MOS transistor (thin film semiconductor device) 260 comprising a polycrystalline silicon thin film (semiconductor thin film) 241a, gate insulating film 243, and gate electrode 246. In

column 22, lines 46-47, Noguchi discloses the silicon thin film 241 having a thickness of 40 nm (30-80 nm). In column 22, lines 48-54, Noguchi discloses the excimer laser light being irradiated on the amorphous silicon layer which recrystallizes the layer to a polycrystalline thin film. This excimer laser light is a single shot radiation that avoids the poor uniformity that is found in the polycrystalline films that have irradiation in several pulses (see, for example, column 2, lines 51-64 of Noguchi). In FIG. 21, Noguchi discloses an excimer laser light (single shot irradiation) 215 that forms a borderless (uniform) silicon thin film. Noguchi does not disclose plural units. However, Yamazaki discloses (see, for example, FIG. 1C) a pixel matrix circuit comprising three TFTs (plural units). In column 5, lines 43-45, Yamazaki discloses that pixel matrix circuits have more than one million TFTs. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have plural units in order to form the thin film semiconductor device in a pixel matrix circuit of an LCD device.

6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. '951 in view of Tanaka et al. '744 as applied to claims 12, 28, 40, 54, 65, and 74 above, and further in view of Yamazaki et al. 6,037,197. Noguchi in view of Tanaka does not disclose plural units. However, Yamazaki discloses (see, for example, FIG. 1C) a pixel matrix circuit comprising three TFTs (plural units). In column 5, lines 43-45, Yamazaki discloses that pixel matrix circuits have more than one million TFTs. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have plural units in order to form the thin film semiconductor device in a pixel matrix circuit of an LCD device. .

Response to Arguments

7. Applicant's arguments filed 6/13/05 have been fully considered but they are not persuasive.

Regarding the applicant's argument on page 10, first paragraph, the new limitation "said semiconductor thin film is accumulated by alternately repeating said film forming step and said irradiation step without exposing said substrate to the air" is a product-by-process limitation of producing a thin film with more thickness. The claims clearly state that such a process is used to accumulate said semiconductor thin film, and since the claims already state the structural thickness of the semiconductor thin film being 30-80 nm, the cited prior art (Noguchi), which disclose a thin film having a thickness between 30-80 nm, clearly anticipate the applicant's claims.

Regarding the applicant's argument on page 11, third paragraph that the section 103 rejection fails to meet the proper standards for supporting findings of a reason or motivation to combine references, this argument is not persuasive. The Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184 USPQ 607 (CCPA 1975). In this case, however, it is clear why one would want to combine the invention of Noguchi with Tanaka. Noguchi discloses a thin film transistor and combining it with Tanaka's invention would incorporate the thin film transistor into a more robust LCD display apparatus. Such an incorporation of a thin film transistor into an LCD display apparatus is very common practice in the LCD art and provides the motivation needed in combining Noguchi with Tanaka.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

INFORMATION ON HOW TO CONTACT THE USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
August 9, 2005